

Module for B.Sc. Botany (Honours), 2020-2021

B.Sc. Semester-I (Hons.)			
Unit	Topic	Name of the Teachers	No. of Lectures
Core TI: Phycology and Microbiology			
Unit 1	Introduction to microbial world	Dr. Ranjan Ghosh	10
Unit 2	Viruses		07
Unit 3	Bacteria		09
Unit 4	Algae	Dr. Debjyoti Das	11
Unit 5	Cyanophyta , Xanthophyta and Bacillariophyta		08
Unit 6	Chlorophyta and Charophyta		08
Unit 7	Phaeophyta and Rhodophyta		10
Core P1: Phycology and Microbiology			
Sl. 1	Electron micrographs/Models of viruses	Dr. Ranjan Ghosh	
Sl. 2	Types of Bacteria to be observed from temporary/permanent slides/photographs.		
Sl. 3	Gram staining and simple staining of bacteria.		
Sl. 4	Endospore staining		
Sl. 5	Study of microorganisms from curd sample by simple staining process		
Sl. 6	Study of vegetative and reproductive structures of <i>Nostoc</i> , <i>Zygnema</i> , <i>Oedogonium</i> , <i>Chara</i> , <i>Vaucheria</i> , <i>Fucus</i> and <i>Polysiphonia</i> , through electron micrographs, temporary preparations and permanent slides.	Dr. Debjyoti Das	
Core T2: Biomolecules and Cell Biology			
Unit 1	Biomolecules	Mr. Samir Jana	20
Unit 2	Bioenergenetics		04
Unit 3	Enzymes		06
Unit 4	The cell	Mr. Arup Karmakar	04
Unit 5	Cell wall and plasma membrane		04
Unit 6	Cell organelles		16
Unit 7	Cell division		06
Core P2: Biomolecules and Cell Biology			
Sl. 1	Qualitative tests for carbohydrates, reducing sugars, non-reducing sugars, lipids and proteins	Mr. Samir Jana	
Sl. 2	Study of plant cell structure with the help of epidermal peel mount of Onion/ <i>Rhoeo</i> .		
Sl. 3	Demonstration of the phenomenon of protoplasmic streaming in <i>Hydrilla</i> leaf.		
Sl. 8	Study the phenomenon of plasmolysis and deplasmolysis.		

Sl. 4	Measurement of cell size by the technique of micrometry.	Mr. Arup Karmakar	
Sl. 5	Counting the cells per unit volume with the help of haemocytometer.		
Sl. 6	Study of cell and its organelles with the help of electron micrographs.		
Sl. 7	Cytochemical staining of : DNA- Feulgen and cell wall in the epidermal peel of onion using Periodic Schiff's (PAS) staining technique		
Sl. 9	Study different stages of mitosis and meiosis		

B.Sc. Semester-II (Hons.)

Unit	Topic	Name of the Teachers	No. of Lectures
Core T3: Mycology & Phytopathology			
Unit 1	Introduction to true fungi)	Dr. Ranjan Ghosh	04
Unit 2	Chytridiomycota and Zygomycota		05
Unit 3	Oomycota		04
Unit 4	Ascomycota		10
Unit 5	Basidiomycota		08
Unit 6	Deuteromycota		03
Unit 7	Allied Fungi		02
Unit 8	Symbiotic associations	Mr. Arup Karmakar	04
Unit 9	Applied Mycology		10
Unit 10	Phytopathology		10
Core P3: Mycology & Phytopathology			
Sl. 1	Introduction to the world of fungi (Unicellular, coenocytic/septate mycelium, ascocarps & basidiocarps).	Dr. Ranjan Ghosh	
Sl. 2	<i>Rhizopus</i>		
Sl. 3	<i>Penicillium</i>		
Sl. 8	<i>Ascobolus</i>		
Sl. 4	<i>Alternaria</i>		
Sl. 5	<i>Puccinia</i>		
Sl. 6	<i>Agaricus</i>		
Sl. 7	<i>Albugo</i>		
Sl. 9	Lichens		
Sl. 10	Phytopathology		
Core T4: Archegoniate (Bryophyta, Pteridophyta, & Gymnosperm) and Palaeobotany			
Unit 1	Introduction	Dr. Debjyoti Das	04
Unit 2	Bryophytes	Mr. Arup Karmakar	06
Unit 3	Type Studies- Bryophytes		12
Unit 4	Pteridophytes	Dr. Debjyoti Das	06

Unit 5	Type Studies- Pteridophytes	Dr. Debjyoti Das	14
Unit 6	Gymnosperms	Mr. Animesh Karmakar	14
Unit 7	Palaeobotany	Dr. Debjyoti Das	04
Core P4: Archegoniate (Bryophyta, Pteridophyta, & Gymnosperm) and Palaeobotany			
Sl. 1	<i>Riccia</i>	Dr. Ranjan Ghosh	
Sl. 2	<i>Marchantia</i>		
Sl. 3	<i>Anthoceros</i>		
Sl. 4	<i>Pellia, Porella</i>		
Sl. 5	<i>Sphagnum</i>		
Sl. 6	<i>Funaria</i>		
Sl. 7	<i>Psilotum</i>	Dr. Debjyoti Das	
Sl. 8	<i>Selaginella</i>		
Sl. 9	<i>Equisetum</i>		
Sl. 10	<i>Pteris</i>	Dr. Ranjan Ghosh	
Sl. 11	<i>Cycas</i>		
Sl. 12	<i>Pinus</i>		
Sl. 13	<i>Gnetum</i>	Dr. Debjyoti Das	
Sl. 14	Identification-Petrified Fossil (<i>Calamites</i> and <i>Lyginopteris</i>), Impression Fossil (<i>Glossopteris</i>)		

B.Sc. Semester-III (Hons.)

Unit	Topic	Name of the Teachers	No. of Lectures
Core T5: Morphology & Anatomy of Angiosperms			
Unit 1	Morphology Leaves	Dr. Bandana Pradhan	02
Unit 2	Flower		05
Unit 3	Fruits		02
Unit 4	Dispersal of fruits and seeds		02
Unit 5	Introduction and scope of Plant Anatomy	Dr. Debjyoti Das	03
Unit 6	Structure and Development of Plant Body		05
Unit 7	Tissues		10
Unit 8	Apical meristems		12
Unit 9	Vascular Cambium and Wood		12
Unit 10	Adaptive and Protective Systems		07
Core P5: Morphology & Anatomy of Angiosperms			
Sl. 1	Identification with reasons: Types of leaves, stipules, tendril, inflorescence, fruits, calyx, corolla, androecium, gynoecium.	Dr. Bandana Pradhan	
Sl. 2	Study of anatomical details through permanent slides/temporary stain mounts/ macerations/ museum specimens with the help of suitable examples.	Dr. Debjyoti Das	

Sl. 3	Apical meristem of root, shoot and vascular cambium.		
Sl. 8	Distribution and types of parenchyma, collenchyma and sclerenchyma		
Sl. 4	Root: monocot, dicot, secondary growth.		
Sl. 5	Stem: monocot, dicot - primary and secondary growth		
Sl. 6	Leaf: isobilateral, dorsiventral, C4 leaves (Kranz anatomy).		
Sl. 7	Adaptive Anatomy: xerophytes, hydrophytes		
Sl. 9	Microscopic Identification: Xylem: Tracheary elements-tracheids, vessel elements; xylem fibres. Wood: tyloses ; heart- and sapwood. Phloem: Sieve tubes-sieve plates; companion cells; phloem fibres. Epidermal system: stomata types; trichomes: non-glandular and glandular. Secretory tissues: cavities, lithocysts and laticifers.		

Core T6: Economic Botany and Pharmacognosy

Unit 1	Origin of Cultivated Plants	Dr. Ranjan Ghosh	06
Unit 2	Cereals		06
Unit 3	Legumes		06
Unit 4	Sources of sugars and starches		04
Unit 5	Spices		06
Unit 6	Beverages		04
Unit 7	Sources of oils and fats		10
Unit 8	Natural Rubber		03
Unit 9	Drug-yielding plants		08
Unit 10	Timber plants		03
Unit 11	Fibers		04

Core P6: Economic Botany and Pharmacognosy

Sl. 1	Cereals	Dr. Ranjan Ghosh	
Sl. 2	Legumes:		
Sl. 3	Sources of sugars and starches		
Sl. 4	Sources of oils and fats		
Sl. 9	Fibre-yielding plants		
Sl. 5	Essential oil-yielding plants		
Sl. 6	Rubber		
Sl. 7	Drug-yielding plants		
Sl. 8	Wood		

Core T7: Genetics

Unit 1	Mendelian genetics and its extension	Mr. Animesh Karmakar	16
Unit 2	Extrachromosomal Inheritance		06
Unit 3	Linkage, crossing over and chromosome mapping		12
Unit 4	Variation in chromosome number and structure	Mr. Arup Karmakar	08
Unit 5	Gene mutations		06
Unit 6	Fine structure of gene		06
Unit 7	Population and Evolutionary Genetics		06

Core P7: Genetics

Sl. 1	Meiosis through temporary squash preparation.	Mr. Animesh Karmakar	
Sl. 2	Mendel's laws through seed ratios. Laboratory exercises in probability and chi-square.		
Sl. 3	Chromosome mapping using point test cross data.		
Sl. 4	Pedigree analysis for dominant and recessive autosomal and sex linked traits.		
Sl. 5	Incomplete dominance and gene interaction through seed ratios (9:7, 12:3:1).		
Sl. 6	Study of aneuploidy: Down's, Klinefelter's and Turner's syndromes.	Mr. Arup Karmakar	
Sl. 7	Photographs/Permanent Slides showing Translocation Ring, Laggards and Inversion Bridge.		
Sl. 8	Study of human genetic traits: Sickle cell anemia, Xeroderma Pigmentosum, Albinism, redgreen, Colour blindness, Widow's peak, Rolling of tongue, Hitchhiker's thumb and Attached ear lobe		

SEC T1: Biofertilisers

Unit 1	General account about the microbes used as biofertilizer	Dr. Bandana Pradhan	04
Unit 2	<i>Azospirillum</i> : isolation and mass multiplication		08
Unit 3	Cyanobacteria (blue green algae),		04
Unit 4	Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution,		08
Unit 5	Organic farming		06

B.Sc. Semester-IV (Hons.)

Unit	Topic	Name of the Teachers	No. of Lectures
Core T8: Molecular Biology			
Unit 1	Nucleic acids: Carriers of genetic information	Mr. Animesh Karmakar	04
Unit 2	The Structures of DNA and RNA / Genetic Material		10
Unit 3	The replication of DNA	Mr. Arup Karmakar	10
Unit 4	Central dogma and genetic code		02

Unit 5	Transcription		18
Unit 6	Processing and modification of RNA		08
Unit 7	Translation	Mr. Animesh Karmakar	08
Core P8: Molecular Biology			
Sl. 1	Preparation of LB medium and raising <i>E.Coli</i>	Mr. Arup Karmakar	
Sl. 2	Demonstration of isolation of genomic DNA from <i>E.Coli</i> .		
Sl. 3	DNA estimation by diphenylamine reagent/UV Spectrophotometry.		
Sl. 4	Study of DNA replication mechanisms through photographs (Rolling circle, Theta replication and semi-discontinuous replication).		
Sl. 5	Study of DNA replication mechanisms through photographs (Rolling circle, Theta replication and semi-discontinuous replication).		
Sl. 6	Photographs establishing nucleic acid as genetic material (Messelson and Stahl's, Avery et al, Griffith's, Hershey & Chase's and Fraenkel & Conrat's experiments)		
Sl. 7	Study of the following through photographs: Assembly of Spliceosome machinery; Splicing mechanism in group I & group II introns; Ribozyme and Alternative splicing.		
Core T9: Plant Ecology and Phytogeography			
Unit 1	Introduction	Dr. Debjyoti Das	04
Unit 2	Soil		08
Unit 3	Water		04
Unit 4	Light, temperature, wind and fire		06
Unit 5	Biotic interactions		02
Unit 6	Population ecology		04
Unit 7	Plant communities		08
Unit 8	Ecosystems		04
Unit 9	Functional aspects of ecosystem		08
Unit 10	Phytogeography		12
Core P9 : Plant Ecology and Phytogeography			
Sl. 1	Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.	Dr. Debjyoti Das	
Sl. 2	Determination of pH of various soil and water samples (pH meter and pH paper)		
Sl. 3	Analysis for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from two soil samples by rapid field tests		
Sl. 4	Determination of dissolved oxygen of water samples from polluted and unpolluted sources.		
Sl. 5	Ecological adaptations of some species: Ipomoea		

	aquatica stem, Phyllode of <i>Acaccia auriculiformis</i> , Nerium leaf and Vanda root.		
Sl. 6	Determination of minimal quadrat size for the study of Sl. herbaceous vegetation in the college campus, by species area curve method (species to be listed)		
Sl. 7	Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law.		
Sl. 8	Quantitative analysis of herbaceous vegetation for density and abundance in the college campus.		

Core T10: Plant Systematics

Unit 1	Significance of Plant systematics	Dr. Bandana Pradhan	10
Unit 2	Taxonomic hierarchy		04
Unit 3	Botanical nomenclature		08
Unit 4	Systems of classification		10
Unit 5	Biometrics, numerical taxonomy and cladistics		08
Unit 6	Phylogeny of Angiosperms		10
Unit 7	Salient features of the following families.....		10

Core P10: Plant Systematics

Sl. 1	Families: Brassicaceae, Malvaceae, Fabaceae, Apiaceae, Apocynaceae, Asclepiadaceae, Asteraceae, Solanaceae, Scrophulariaceae,	Dr. Bandana Pradhan	
Sl. 1	Lamiaceae, Verbenaceae, Acanthaceae, Rubiaceae, Cucurbitaceae, Euphorbiaceae, Poaceae, Orchidaceae	Mr. Animesh Karmakar	

SEC T2: Mushroom Culture Technology

Unit 1	Introduction, history. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms. Types of edible mushrooms available in India <i>Volvariella volvacea</i> , <i>Pleurotus citrinopileatus</i> , <i>Agaricus bisporus</i>	Dr. Bandana Pradhan	05
Unit 2	Cultivation Technology		12
Unit 3	Storage and nutrition	Dr. Ranjan Ghosh	08
Unit 4	Food Preparation	Dr. Bandana Pradhan	05

B.Sc. Semester-V (Hons.)

Core T11: Reproductive Biology of Angiosperms

Unit 1	Introduction of Reproductive Biology	Dr. Debjyoti Das	04
Unit 2	Reproductive development		06
Unit 3	Anther and pollen biology		10
Unit 4	Ovule	Dr. Ranjan Ghosh	10
Unit 5	Pollination and fertilization		06
Unit 6	Self incompatibility		10
Unit 7	Embryo, Endosperm and Seed		10

Unit 8	Polyembryony and apomixis		06
Core P11: Reproductive Biology of Angiosperms			
Sl. 1	Anther	Dr. Debjyoti Das	
Sl. 2	Pollen grains		
Sl. 3	Ovule	Dr. Ranjan Ghosh	
Sl. 4	Female gametophyte through permanent slides/ photographs		
Sl. 5	Intra-ovarian pollination; Test tube pollination through photographs		
Sl. 6	Endosperm		
Sl. 7	Embryogenesis		
Core T12: Plant Physiology			
Unit 1	Plant-water relations	Mr. Samir Jana	10
Unit 2	Mineral nutrition		08
Unit 3	Nutrient Uptake		08
Unit 4	Translocation in the phloem		08
Unit 5	Plant growth regulators	Mr. Arup Karmakar	14
Unit 6	Physiology of flowering		06
Unit 7	Phytochrome , crytochromes and phototropins		06
Core P12: Plant Physiology			
Sl. 1	Determination of isotonic concentration and osmotic pressure of plant cell sap by plasmolytic method.	Mr. Samir Jana	
Sl. 2	Determination of water potential of given tissue (potato tuber) by weight method.		
Sl. 3	Study of the effect of humidity and light on the rate of transpiration in excised twig/leaf		
Sl. 4	Determination of water absorption, retention and transpiration.		
Sl. 5	Calculation of stomatal index and stomatal frequency from the two surfaces of leaves of a mesophyte and xerophyte		
Sl. 6	To study the phenomenon of seed germination (effect of light).		
Sl. 7	To study the effect of different concentrations of IAA on <i>Avena</i> coleoptile elongation (IAA Bioassay).		
Sl. 8	To study the induction of amylase activity in germinating barley grains.		
DSE T1: Natural Resource Management			
Unit 1	Natural resources	Dr. Bandana Pradhan	02
Unit 2	Sustainable utilization		08

Unit 5	Biological Resources		12
Unit 6	Forests		60
Unit 7	Energy		06
Unit 8	Contemporary practices in resource management		08
Unit 9	National and international efforts in resource management and conservation		04
Unit 3	Land		08
Unit 4	Water		08

DSE P1: Natural Resource Management

Sl. 1	Estimation of solid waste generated by a domestic system (biodegradable and non biodegradable) and its impact on land degradation.	Dr. Bandana Pradhan	
Sl. 2	Collection of data on forest cover of specific area.		
Sl. 3	Measurement of dominance of woody species by DBH (diameter at breast height) method.		
Sl. 4	Calculation and analysis of ecological footprint		
Sl. 5	Ecological modeling.		

DSE T2: Plant Breeding

Unit 1	Plant Breeding	Mr. Animesh Karmakar	10
Unit 2	Methods of crop improvement		20
Unit 3	Quantitative inheritance		10
Unit 4	Inbreeding depression and heterosis		10
Unit 5	Crop improvement and breeding		10

B.Sc. Semester-VI (Hons.)

Unit	Topic	Name of the Teachers	No. of Lectures
Core T13: Plant Metabolism			
Unit 1	Concept of metabolism	Mr. Samir Jana	06
Unit 2	Carbon assimilation		14
Unit 3	Carbohydrate metabolism		02
Unit 4	Carbon Oxidation		10
Unit 5	ATP-Synthesis		08
Unit 6	Lipid metabolism	Mr. Arup Karmakar	08
Unit 7	Nitrogen metabolism		08
Unit 8	Mechanisms of signal transduction		04
Core P13: Plant Metabolism			
Sl. 1	Preparation of molar, molal & normal solution	Mr. Samir Jana	
Sl. 2	Chromatographic separation of photosynthetic pigments.		
Sl. 3	Experimental demonstration of Hill's reaction.		
Sl. 4	To study the effect of light intensity on the rate of photosynthesis.		
Sl. 5	Effect of carbon dioxide on the rate of photosynthesis.		

Sl. 6	To compare the rate of respiration in different parts of a plant.		
Sl. 7	RQ of different respiratory substrate of germinating seeds.		
Sl. 8	Seed Viability Test by TTC.		
Sl. 9	Demonstration of absorption spectrum of photosynthetic pigments.		
Core T14: Plant Biotechnology			
Unit 1	Plant Tissue Culture	Dr. Bandana Pradhan	16
Unit 2	Recombinant DNA technology	Mr. Arup Karmakar	12
Unit 3	Gene Cloning		10
Unit 4	Methods of gene transfer		08
Unit 5	Applications of Biotechnology	Dr. Ranjan Ghosh	14
Core P14: Plant Biotechnology			
Sl. 1	(a) Preparation of MS medium. (b) Demonstration of in vitro sterilization and inoculation methods using leaf and nodal explants of tobacco, Datura, Brassica etc	Mr. Arup Karmakar	
Sl. 2	Study of anther, embryo and endosperm culture, micropropagation, somatic embryogenesis & artificial seeds through photographs.		
Sl. 3	Construction of restriction map of circular and linear DNA from the data provided.		
Sl. 4	Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment.		
Sl. 5	Study of steps of genetic engineering for production of Bt cotton, Golden rice, Flavr Savr tomato through photographs.		
Sl. 6	Isolation of plasmid DNA.		
Sl. 7	Restriction digestion and gel electrophoresis of plasmid DNA.		
DSE T3: Industrial & Environmental Microbiology			
Unit 1	Scope of microbes in industry and environment	Dr. Ranjan Ghosh	06
Unit 2	Bioreactors/Fermenters and fermentation processes		12
Unit 3	Microbial production of industrial products		12
Unit 4	Microbial enzymes of industrial interest and enzyme immobilization		08
Unit 5	Microbes and quality of environment	Dr. Debjyoti Das	06
Unit 6	Microbial flora of water		08
Unit 7	Microbes in agriculture and remediation of contaminated soils		08
DSE P3: Industrial & Environmental Microbiology			
Sl. 1	Principles and functioning of instruments in microbiology laboratory	Dr. Ranjan Ghosh	
Sl. 2	Hands on sterilization techniques and preparation of culture media.	Dr. Debjyoti Das	

DSE T4: Research Methodology

Unit 1	Basic concepts of research	Dr. Debjyoti Das	10
Unit 2	General laboratory practices	Mr. Samir Jana	12
Unit 3	Data collection and documentation of observations	Mr. Animesh Karmakar	06
Unit 4	Overview of Biological Problems	Dr. Debjyoti Das	06
Unit 5	Methods to study plant cell/tissue structure	Dr. Bandana Pradhan	06
Unit 6	Plant microtechniques	Dr. Ranjan Ghosh	12
Unit 7	The art of scientific writing and its presentation	Mr. Arup Karmakar	08

DSE P4: Research Methodology

Sl. 1	Experiments based on chemical calculations.	Mr. Samir Jana	
Sl. 2	Plant microtechnique experiments.	Dr. Ranjan Ghosh	
Sl. 3	The art of imaging of samples through microphotography and field photography.	Mr. Animesh Karmakar	
Sl. 4	Poster presentation on defined topics.	Mr. Arup Karmakar	
Sl. 5	Technical writing on topics assigned.	All Teachers	

Module for B.Sc. Botany (Hons.) Generic Elective, 2020-2021

B.Sc. Semester-I (GE)			
Unit	Topic	Name of the Teachers	No. of Lectures
CC-1A T1: Plant Biodiversity [Microbes, Algae, Fungi, Archegoniate]			
Unit 1	Microbes	Mr. Arup Karmakar	04
Unit 2	Algae	Dr. Debjyoti Das	04
Unit 3	Fungi	Dr. Ranjan Ghosh	04
Unit 4	Introduction to Archegoniate	Dr. Bandana Pradhan	05
Unit 5	Bryophytes		02
Unit 6	Pteridophytes	Dr. Debjyoti Das	04
Unit 7	Gymnosperms	Mr. Animesh Karmakar	04
CC-1A P1: Plant Biodiversity [Microbes, Algae, Fungi, Archegoniate]			
Sl. 1	EMs/Models of viruses	Dr. Ranjan Ghosh	
Sl. 2	Types of Bacteria from temporary/permanent slides/photographs		
Sl. 3	Gram staining & simple staining process		
Sl. 4	Study of vegetative and reproductive structures of <i>Nostoc</i> , <i>Chlamydomonas</i> (electron micrographs), <i>Oedogonium</i> , <i>Oscillatoria</i> , through temporary preparations and <i>Fucus</i> & <i>Polysiphonia</i> - Specimen and permanent slides	Dr. Debjyoti Das	
Sl. 5	<i>Rhizopus and Penicillium</i>	Dr. Ranjan Ghosh	
Sl. 6	<i>Alternaria</i>		
Sl. 7	<i>Puccinia</i>		
Sl. 8	<i>Agaricus</i>		
Sl. 9	Lichens		
Sl. 10	Mycorrhiza		
Sl. 11	<i>Marchantia</i>	Dr. Bandana Pradhan	
Sl. 12	<i>Funaria</i>		
Sl. 13	<i>Selaginella</i>	Dr. Debjyoti Das	
Sl. 14	<i>Pteris</i>		
Sl. 15	<i>Cycas</i>	Mr. Animesh Karmakar	
Sl. 16	<i>Pinus</i>		

B.Sc. Semester-II (GE)			
Unit	Topic	Name of the Teachers	No. of Lectures
CC-1B T2: Plant Ecology, Morphology & Taxonomy			
Unit 1	Introduction	Dr. Debjyoti Das	02
Unit 2	Ecological factors		10
Unit 3	Plant communities		06
Unit 4	Ecosystem		08
Unit 5	Phytogeography		04
Unit 6	Morphology	Mr. Animesh Karmakar	04
Unit 7	Introduction to plant taxonomy		02
Unit 8	Identification		04
Unit 9	Taxonomic Evidences		05
Unit 10	Taxonomic hierarchy	Dr. Bandana Pradhan	02
Unit 11	Botanical nomenclature		05
Unit 12	Classification		04
Unit 13	Workout		04
CC-1B P2: Plant Ecology, Morphology & Taxonomy			
Sl. 1	Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.	Dr. Debjyoti Das	
Sl. 2	Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.		
Sl. 3	Ecological adaptations of some species: <i>Ipomoea aquatica</i> stem, <i>Nerium</i> leaf and <i>Vanda</i> root.		
Sl. 4	Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method. (species to be listed)		
Sl. 5	Quantitative analysis of herbaceous vegetation in the		
Sl. 6	Study of vegetative and floral characters of the following families.....	Mr. Animesh Karmakar	

B.Sc. Semester-III (GE)			
Unit	Topic	Name of the Teachers	No. of Lectures
CC-1C T3 - Genetics and Plant Breeding			
Unit 1	Heredity	Mr. Animesh Karmakar	20
Unit 2	Sex-determination and Sex-linked Inheritance		04
Unit 3	Linkage and Crossing over		08
Unit 4	Mutations and Chromosomal Aberrations		06
Unit 5	Plant Breeding	Mr. Arup Karmakar	04
Unit 6	Methods of crop improvement		10

Unit 7	Inbreeding depression and heterosis		04
Unit 8	Crop improvement and breeding		04
CC-1C P3 Genetics and Plant Breeding			
Sl. 1	Mendel's laws through seed ratios. Laboratory exercises in probability and chi- square.	Mr. Animesh Karmakar	
Sl. 2	Incomplete dominance and gene interaction through seed ratios (9:7, 12:3:1,).		
Sl. 3	Study of aneuploidy: Down's, Klinefelter's and Turner's syndromes through photographs		
Sl. 4	Photographs/Permanent Slides showing Translocation Ring, Laggards and Inversion Bridge		
Sl. 5	Hybridization techniques - Emasculation, Bagging (For demonstration only).	Mr. Arup Karmakar	
Sl. 6	Induction of polyploidy conditions in plants (For demonstration only).		

B.Sc. Semester-IV (GE)			
Unit	Topic	Name of the Teachers	No. of Lectures
DSE-1D T4: Plant Physiology & Metabolism			
Unit 1	Plant-water relations	Mr. Samir Jana	08
Unit 2	Mineral nutrition		08
Unit 3	Translocation in phloem		06
Unit 4	Photosynthesis		12
Unit 5	Respiration		06
Unit 6	Enzymes		04
Unit 7	Nitrogen metabolism		04
Unit 8	Plant growth regulators		06
Unit 9	Plant response to light and temperature		06
DSC-1D P4: Plant Physiology & Metabolism			
Sl. 1	Determination of osmotic potential of plant cell sap by plasmolytic method.	Mr. Samir Jana	
Sl. 2	To study the effect of two environmental factors (light and humidity) on transpiration by excised twig.		
Sl. 3	Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.		
Sl. 4	Demonstration of Hill reaction.		
Sl. 5	To study the effect of light intensity and bicarbonate concentration on O ₂ evolution in photosynthesis.		
Sl. 6	Comparison of the rate of respiration in any two parts of a plant.		

Module for B.Sc. Botany (Programme), 2020-2021

B.Sc. Semester-I (Prog.)			
Unit	Topic	Name of the Teachers	No. of Lectures
CC-1A T1: Plant Biodiversity [Microbes, Algae, Fungi, Archegoniate]			
Unit 1	Microbes	Mr. Arup Karmakar	04
Unit 2	Algae	Dr. Debjyoti Das	04
Unit 3	Fungi	Dr. Ranjan Ghosh	04
Unit 4	Introduction to Archegoniate	Dr. Bandana Pradhan	05
Unit 5	Bryophytes		02
Unit 6	Pteridophytes	Dr. Debjyoti Das	04
Unit 7	Gymnosperms	Mr. Animesh Karmakar	04
CC-1A P1: Plant Biodiversity [Microbes, Algae, Fungi, Archegoniate]			
Sl. 1	EMs/Models of viruses	Dr. Ranjan Ghosh	
Sl. 2	Types of Bacteria from temporary/permanent slides/photographs		
Sl. 3	Gram staining & simple staining process		
Sl. 4	Study of vegetative and reproductive structures of <i>Nostoc</i> , <i>Chlamydomonas</i> (electron micrographs), <i>Oedogonium</i> , <i>Oscillatoria</i> , through temporary preparations and <i>Fucus</i> & <i>Polysiphonia</i> - Specimen and permanent slides	Dr. Debjyoti Das	
Sl. 5	<i>Rhizopus and Penicillium</i>	Dr. Ranjan Ghosh	
Sl. 6	<i>Alternaria</i>		
Sl. 7	<i>Puccinia</i>		
Sl. 8	<i>Agaricus</i>		
Sl. 9	Lichens		
Sl. 10	Mycorrhiza		
Sl. 11	<i>Marchantia</i>	Dr. Bandana Pradhan	
Sl. 12	<i>Funaria</i>		
Sl. 13	<i>Selaginella</i>	Dr. Debjyoti Das	
Sl. 14	<i>Pteris</i>		
Sl. 15	<i>Cycas</i>	Mr. Animesh Karmakar	
Sl. 16	<i>Pinus</i>		

B.Sc. Semester-II (Prog.)			
Unit	Topic	Name of the Teachers	No. of Lectures
CC-1B T2: Plant Ecology, Morphology & Taxonomy			
Unit 1	Introduction	Dr. Debjyoti Das	02
Unit 2	Ecological factors		10
Unit 3	Plant communities		06
Unit 4	Ecosystem		08
Unit 5	Phytogeography		04
Unit 6	Morphology	Mr. Animesh Karmakar	04
Unit 7	Introduction to plant taxonomy		02
Unit 8	Identification		04
Unit 9			05
Unit 10	Taxonomic hierarchy	Dr. Bandana Pradhan	02
Unit 11	Botanical nomenclature		05
Unit 12	Classification		04
Unit 13	Workout		04
CC-1B P2: Plant Ecology, Morphology & Taxonomy			
Sl. 1	Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.	Dr. Debjyoti Das	
Sl. 2	Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.		
Sl. 3	Ecological adaptations of some species: <i>Ipomoea aquatica</i> stem, <i>Nerium</i> leaf and <i>Vanda</i> root.		
Sl. 4	Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method. (species to be listed)		
Sl. 5	Quantitative analysis of herbaceous vegetation in the		
Sl. 6	Study of vegetative and floral characters of the following families.....	Mr. Animesh Karmakar	

B.Sc. Semester-III (Prog.)			
Unit	Topic	Name of the Teachers	No. of Lectures
CC-1C T3 - Genetics and Plant Breeding			
Unit 1	Heredity	Mr. Animesh Karmakar	20
Unit 2	Sex-determination and Sex-linked Inheritance		04
Unit 3	Linkage and Crossing over		08
Unit 4	Mutations and Chromosomal Aberrations		06
Unit 5	Plant Breeding	Mr. Arup Karmakar	04
Unit 6	Methods of crop improvement		10

Unit 7	Inbreeding depression and heterosis		04
Unit 8	Crop improvement and breeding		04
CC-1C P3 Genetics and Plant Breeding			
Sl. 1	Mendel's laws through seed ratios. Laboratory exercises in probability and chi- square.	Mr. Animesh Karmakar	
Sl. 2	Incomplete dominance and gene interaction through seed ratios (9:7, 12:3:1,).		
Sl. 3	Study of aneuploidy: Down's, Klinefelter's and Turner's syndromes through photographs		
Sl. 4	Photographs/Permanent Slides showing Translocation Ring, Laggards and Inversion Bridge		
Sl. 5	Hybridization techniques - Emasculation, Bagging (For demonstration only).	Mr. Arup Karmakar	
Sl. 6	Induction of polyploidy conditions in plants (For demonstration only).		
SEC T1 Biofertilizers			
Unit 1	General account about the microbes used as biofertilizer	Dr. Bandana Pradhan	04
Unit 2	<i>Azospirillum</i> : isolation and mass multiplication		08
Unit 3	Cyanobacteria (blue green algae), <i>Azolla</i> and <i>Anabaena azollae</i> association, nitrogen fixation, factors affecting growth, blue green algae and <i>Azolla</i> in rice cultivation		04
Unit 4	Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield		08
Unit 5	Organic farming		06

B.Sc. Semester-IV (Prog.)			
Unit	Topic	Name of the Teachers	No. of Lectures
DSE-1D T4: Plant Physiology & Metabolism			
Unit 1	Plant-water relations	Mr. Arup Karmakar	08
Unit 2	Mineral nutrition		08
Unit 3	Translocation in phloem		06
Unit 4	Photosynthesis		12
Unit 5	Respiration		06
Unit 6	Enzymes		04
Unit 7	Nitrogen metabolism		04
Unit 8	Plant growth regulators		06
Unit 9	Plant response to light and temperature		06
DSC-1D P4: Plant Physiology & Metabolism			

Sl. 1	Determination of osmotic potential of plant cell sap by plasmolytic method.	Mr. Samir Jana	
Sl. 2	To study the effect of two environmental factors (light and humidity) on transpiration by excised twig.		
Sl. 3	Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.		
Sl. 4	Demonstration of Hill reaction.		
Sl. 5	To study the effect of light intensity and bicarbonate concentration on O ₂ evolution in photosynthesis.		
Sl. 6	Comparison of the rate of respiration in any two parts of a plant.		

SEC-2 (Theory): Nursery & Gardening

Unit 1	Nursery	Mr. Animesh Karmakar	04
Unit 2	Seed		06
Unit 3	Vegetative Propagation	Dr. Bandana Pradhan	06
Unit 4	Gardening		08
Unit 5	Sowing/raising of seeds and seedlings		06

B.Sc. Semester-V (Prog.)

Unit	Topic	Name of the Teachers	No. of Lectures
DSE T1 Cell and Molecular Biology			
Unit 1	Techniques in Biology	Mr. Arup Karmakar	08
Unit 2	Cell as a unit of Life		02
Unit 3	Cell Organelles		20
Unit 4	Cell Membrane and Cell Wall		06
Unit 5	Cell Cycle		06
Unit 6	Genetic material		06
Unit 7	Transcription (Prokaryotes and Eukaryotes)		06
Unit 8	Regulation of gene expression		06
DSE P1 Cell and Molecular Biology			
Sl. 1	To study prokaryotic cells (bacteria), viruses, eukaryotic cells with the help of light and electron micrographs	Mr. Arup Karmakar	
Sl. 2	Study of the photomicrographs of cell organelles		
Sl. 3	To study the structure of plant cell through temporary mounts.		
Sl. 7	Study of plasmolysis and deplasmolysis on <i>Rhoeo</i> leaf.		
Sl. 8	Measure the cell size (either length or breadth/diameter) by micrometry.		

Sl. 6	Demonstration of dialysis of starch and simple sugar.		
Sl. 4	Study of mitosis and meiosis (temporary mounts and permanent slides).		
Sl. 5	Study the effect of temperature, organic solvent on semi permeable membrane		
Sl. 9	Study the structure of nuclear pore complex by photograph (from Gerald Karp) Study of special chromosomes (polytene & lampbrush) either by slides or photographs.		
Sl. 10	Study DNA packaging by micrographs		
Sl. 11	Preparation of the karyotype and ideogram from given photograph of somatic metaphase chromosome		
SEC T5 Medicinal Botany			
Unit 1	History, Scope and Importance of Medicinal Plants.	Dr. Bandana Pradhan	10
Unit 2	Conservation of endangered and endemic medicinal plants.		10
Unit 3	Ethnobotany and Folk medicines		10

B.Sc. Semester-VI (Programme)			
Unit	Topic	Name of the Teachers	No. of Lectures
DSE-1B (Theory): Economic Botany and Biotechnology			
Unit 1	Origin of Cultivated Plants	Dr. Ranjan Ghosh	04
Unit 2	Cereals		04
Unit 3	Legumes		06
Unit 4	Spices		06
Unit 5	Beverages		04
Unit 6	Oils and Fats		04
Unit 7	Fibre Yielding Plants		04
Unit 8	Introduction to biotechnology	Dr. Debjyoti Das	02
Unit 9	Plant tissue culture		08
Unit 10	Recombinant DNA Techniques	Dr. Ranjan Ghosh	18
DSE-1B (Practical): Economic Botany and Biotechnology			
Sl. 1	Study of economically important plants : Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and microchemical tests	Dr. Ranjan Ghosh	
S. 2	Familiarization with basic equipments in tissue culture.		
Sl. 3	Study through photographs: Anther culture, somatic embryogenesis, endosperm and embryoculture; micropropagation.		
Sl. 4	Study of molecular techniques: PCR, Blotting techniques, AGE and PAGE.		

SEC-4: (Theory): Mushroom Culture Technology

Unit 1	Introduction, history. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms. Types of edible mushrooms available in India - <i>Volvariella volvacea</i> , <i>Pleurotus citrinopileatus</i> , <i>Agaricus bisporus</i> .	Dr. Bandana Pradhan	05
Unit 2	Cultivation Technology		12
Unit 3	Storage and nutrition		08
Unit 4	Food Preparation		05